

THERE IS CLAIMED:

1. A method of transmitting QAM-16 modulated digital signals in which each of sixteen states represents a symbol with four bits and is represented in a complex plane by a point with particular coordinates, in each quadrant of the complex plane four points represent four numbers each of four bits, in which numbers the last two bits are the same and the first two bits represent numbers that are all different, the numbers are divided into four subsets over the whole of the complex plane, each subset is formed by the set of numbers having the same first two bits, so that the numbers are therefore in the four different quadrants, and the coordinates of the symbols in the complex plane are chosen so that each subset takes the place of another subset after a rotation of  $\pm K\pi/2$ , where K is an integer.
2. The method claimed in claim 1 wherein the succession of said last two bits from one quadrant to another is a Gray succession.
3. The method claimed in claim 1 wherein the succession of the first two bits of each symbol in each quadrant is a Gray succession.
4. The method claimed in claim 1 wherein, prior to modulation, the four-bit numbers to be transmitted are coded using an error corrector code that is transparent to phase rotations in order to add to the symbols transmitted supplementary symbols enabling transmission errors to be corrected at the receiver.
5. The method claimed in claim 4 wherein the error corrector code is a product code and the bits are considered individually with an error corrector code that is transparent to phase rotations.
6. The method claimed in claim 1 wherein, for coding using the error corrector code, the first two digits of each symbol are coded together and the two digits of each symbol are coded together.
7. The method claimed in claim 6 wherein the error corrector code is a product code and, to code the first or last two bits I and Q, said two bits are placed on different rows but in the same column so that each row includes only one type of bit, I or Q, the coding using an error corrector code is effected:  
row by row, and  
by pairs of adjacent columns

the code bits I of two associated adjacent columns are deduced from the I bits of said two columns, the code Q bits of said two associated adjacent columns are similarly deduced from the Q bits of said columns, said code bits are disposed in the same fashion as the starting bits, i.e. so that each row contains only one type of bit, I or Q, and the pairs of adjacent code I and Q bits in the same column are transmitted like the other symbols.

8. The method claimed in claim 6 wherein the error corrector code is a product code and, for coding the first two bits or the last two bits of each four-digit number, the two bits I and Q of a symbol are placed in the same row so that each of the rows is formed of pairs of I and Q bits, the rows and the columns are disposed so that the I and Q bits in each column alternate, the rows and the columns are coded by adjacent pairs so that the code I bits are derived from the I bits of two associated adjacent rows (columns), the code Q bits of said two adjacent rows (columns) are similarly derived only from the Q bits of said two rows (columns), the code bits are disposed like the starting bits, and the pairs of code I and Q bits in each row are transmitted like the other symbols.
9. The method claimed in claim 5 wherein, prior to coding using said error corrector code, two-dimensional differential coding is effected twice.
10. A method of receiving QAM-16 digital signals transmitted by the transmission method as claimed in any of claims 1 to 9, wherein a four-bit symbol is assigned to each signal received according to its phase and its amplitude.